Exhibit O

Discussion on the Genesis of Longsheng Talc Mine in Guangxi Province

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I. Overview of Ore Deposit Geology

Longsheng talc mine in Guangxi Province is the largest talc treasury in South China, and the ore deposit occurs in the east wing of Sanmen complex overturned anticline (See Figure 1), strictly controlled by NNE regional compressive fracture structure (Metallogenic structure) as well as dolomite marble ($ptbh^5$) and spilite ($ptbh^4$). According to the linear distribution features of talc ore occurrence as well as the dependence relationship with the NNE compressive fracture, the talc mine can be roughly divided into two metallogenic belts. The first metallogenic belt, controlled by F_1 fracture, is mainly comprised of Guping Mining District, Lower Jizhua Mining District and Tongzishan Mining District. This metallogenic belt having a length of about 8km is the most important talc base in this zone. The second metallogenic belt, controlled by F_3 fracture, is mainly comprised of Middle Jizhua Mining District and Gutang Mining District. This metallogenic belt having a total length of 12km is only second to the first metallogenic belt in the industrial significance. The metallogenic geological conditions of each mining district are basically similar, and the scale of the Lower Jizhua Mining District is largest.

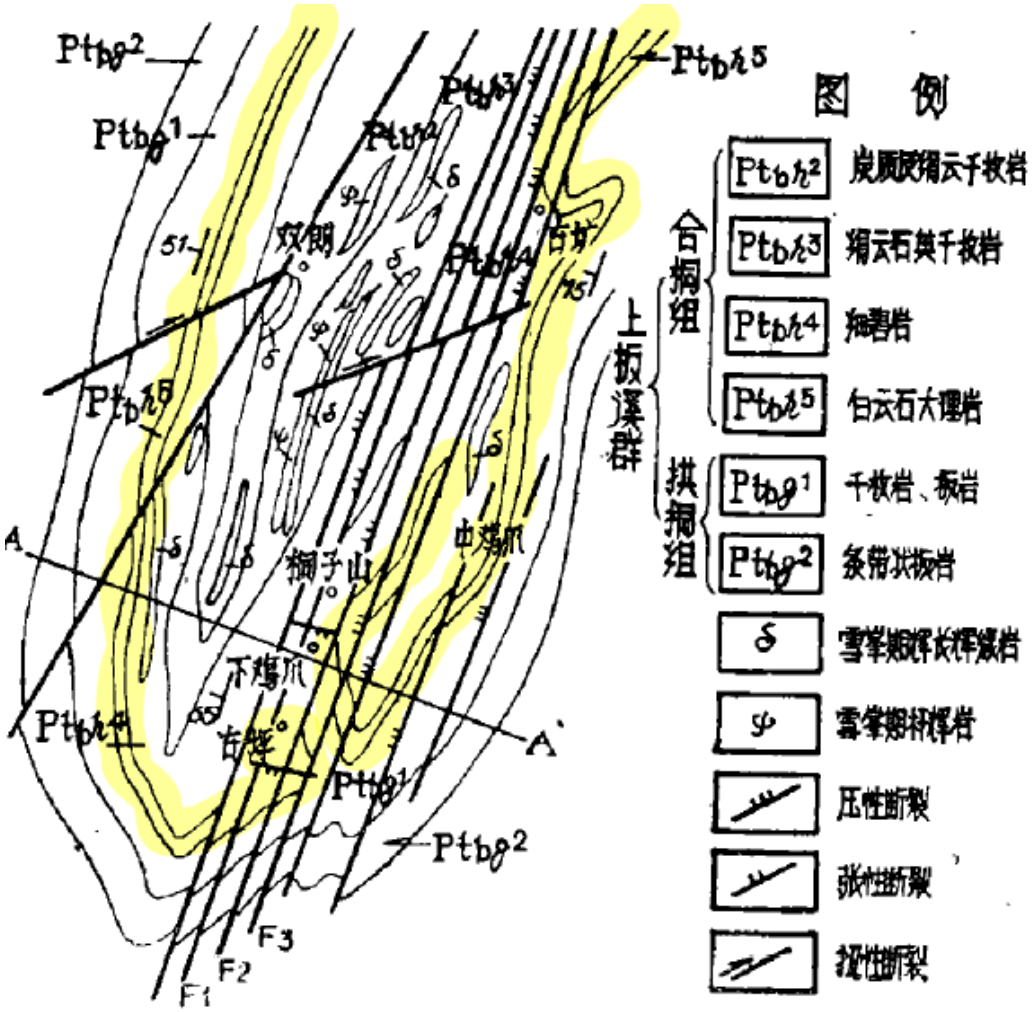


Figure 1 Regional Geological Map of Longsheng Talc Mine

图例	Legend
上板溪群	Upper Banxi Group
合桐组	Hetong Formation
炭质绢云千枚岩	Carbonaceous sericite phyllite
绢云石英千枚岩	Sericite quartz phyllite
细碧岩	Spilite
白云石大理岩	Dolomite marble
拱桐组	Gongtong Formation
千枚岩、板岩	Phyllite and slate
条带状板岩	Stripped slate

Reference Translation- may contain inconsistencies

雪峰期辉长辉绿岩	Gabbro-diabase in Xuefeng period
雪峰期杆辉岩	Olivine-bearing pyroxenite in Xuefeng period
压性断裂	Compressive fracture
张性断裂	Tensional fracture
扭性断裂	Torsional fracture
桐子山	Tongzishan
下鸡爪	Lower Jizhua
中鸡爪	Middle Jizhua
古坪	Guping
双朗	Shuanglang
古塘	Gutang

In this zone, the talc ores occur in the dolomite marble (ptbh^5). The ore body is laminar or lenticular, and the occurrence is roughly the same as the surrounding rocks, inclined to NWW with an inclination angle of 35-65°. The dolomite marble remains are always sandwiched in the talc ores and the talc ores are clearly bounded with the surrounding rocks and horse stones. The common paragenetic mineral is quartz stone and very few calcite clumps are occasionally seen.

Ore quality: generally grayish white-light green, occasionally grayish green, containing 60-62% SiO_2, 30-31% MgO and 0.4-1.6% Fe_2O_3 (generally less than 0.8%). According to the statistics of Guping Mining District and Lower Jizhua Mining District, the content of first-grade ores accounts for 70-75% and the quality is good.

II. Relations between Regional Geology and Mineralization

1. Relations between Formation and Mineralization

The exposed regional formations mainly include the Proterozoic upper Banxi Group, Sinian system and Cambrian system etc. Now the Proterozoic upper Banxi Group is briefly introduced from old to new as follows:

(1) Hetong formation (ptbh)

It is divided into five formations as shown in Figure 1 and Figure 2.

a. ptbh^1: gray-grayish green sericite phyllite and quartz phyllite etc., distributed at the north section of Sanmen complex overturned anticline core (Figure 1 is the south section of anticline) with a thickness of 550m.

b. $ptbh^2$: black gray carbonaceous phyllite and sericite phyllite, exposed at the south section core of Sanmen complex overturned anticline with a thickness of about 200m.

c. $ptbh^3$: grayish green sericite phyllite, slate and siliceous rock, etc. with a thickness of 400m.

d. $ptbh^4$: grayish green spilite sandwiched with grayish green sericite phyllite and siliceous rock with a thickness of 515-861m.

e. $ptbh^5$: thin-medium thick laminar dolomite marble in which the talc ores occur with a thickness of about 200m.

(2) Gongtong formation

a. Lower section of $ptbg^1$: light gray-grayish green sericite quartz phyllite, slate and siliceous rock, etc. with a thickness of 400m.

b. Upper section of $ptbg^2$: stripped slate, phyllite and metasandstone, etc. with a thickness of 150m.

The dolomite marble ($ptbh^5$) is grayish white and medium-fine-grained, containing 18-20% MgO. It is a favorable mother rock for mineralization. In addition, what has an auxiliary relation with mineralization is spilite ($ptbh^4$).

The spilite is greatly developed in this zone, which is a basic rock with submarine eruptive facies and has an obvious pillow-shaped, porous and amygdaloidal structure and a microscopic diabasic structure. The rock is generally altered under the regional metamorphism. The spilite is mainly comprised of soda feldspar (35-45%), tremolite (30-35%), clinozoisite (10-15%) as well as calcite, a small amount of quartz and chlorite. In the east wing of Sanmen complex overturned anticline, when the NNE compressive fracture cuts the spilite, a strong dynamic metamorphic zone is formed in the hanging wall, the primary texture and structure of spilite completely disappear and then the rock is altered into the talcous chlorite schist (containing a large amount of amesite) that has an obvious schistosity structure. The spilite contains 8.14% MgO on average and thus it is a favorable surrounding rock that has an additional effect for mineralization.

2. Relations between Regional Tectonics and Mineralization

The regional tectonics belongs to the Neocathaysian tectonic system. The genesis of ore deposit is closely related to Sanmen complex overturned anticline that has a pinacoidal strike of NE 20-30°, an inclination of NWW, an inclination angle of 60-65°, a length of about 60km and a wing width of 20-25km. This anticline is a closed complex fold that is overturned eastwards and is comprised of two secondary overturned anticlines sandwiched with an overturned syncline. As shown in Figure 2, the formation inclination is NWW, the inclination angle of west wing is 50-60° and the east wing is slightly steep with an inclination angle of 60-70°. In the east wing of this anticline, as the NWW-SEE pressure is highly concentrated, a complex fold belt is formed, the regional longitudinal compressive fracture is greatly developed, and the dynamic metamorphism is so strong to form a series of imbricate fault blocks. In this zone, the talc ore occurrence (ore deposit) is mainly distributed in the NNE compressive fracture zone of the complex anticline's east wing. Although

there is the same favorable formation for mineralization in the west wing of this anticline, as the NNE compressive ore-controlling fracture is not developed and the dynamic metamorphism is weak, the talc ore deposit that has the industrial value is not formed. Therefore, the talc ore is greatly related to the structure of NNE compressive fracture in terms of genesis in this zone.

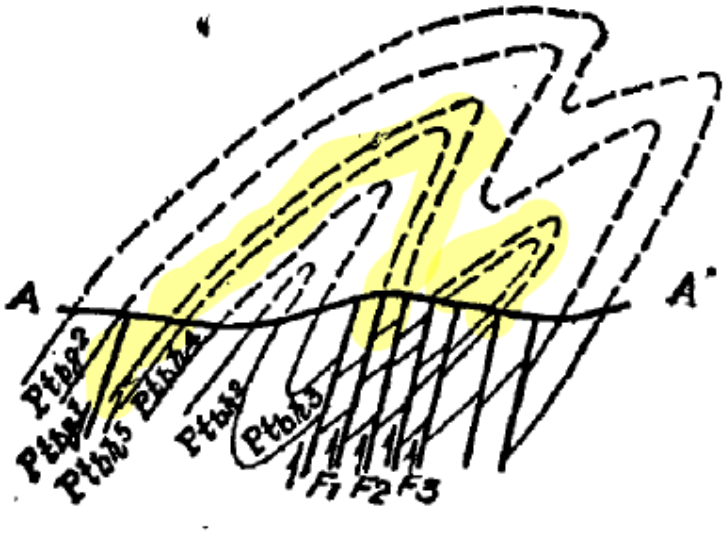


Figure 2 Regional geological profile map of A-A

3. Relations between Regional Igneous Rock and Mineralization

The exposed magmatic rock in this zone is mainly the diabase with hypabyssal facies (δ), including the gabbro-diabase. A few ultra-basic rocks-olivine pyroxenolite (φ) also exist at the anticlinal core. The above magmatic rocks occur along the formation in a shape of rock bed or dyke, mainly in the $ptbh^1$-$ptbh^4$ formations. It is determined that the absolute age is 837 million years and they were formed in Xuefeng Period in relation to the homologous phase-out of spilite.

The above basic-ultra-basic rocks are far apart from the geologic age of Sanmen complex overturned anticline in Caledonian period as well as NNE compressive fracture and talc mineralization. Meanwhile, after six chemical analysis samples of gabbro-diabase are equally grouped, it is shown through calculation that no SiO_2 is left by taking Zavaritskii's chemical graphic calculation method for rocks. In other words, the basic-ultra-basic magma cannot be separated into the excessive acid hydrothermal solution containing SiO_2. See the following table for more details.

The calculation result Q in the following table is a negative value, showing that SiO_2 is insufficient in the gabbro-diabase and thus a lot of acid hydrothermal solution containing SiO_2 cannot be separated. Through field observation, the quartz vein is scarce near the above rock mass and the silicification of surrounding rocks is weak, so it is further demonstrated that this type of magmatic rock has no genesis relationship with the talc ore.

In addition, in the east wing of Sanmen complex anticline, when the regional compressive fracture cuts such formations as $ptbh^1$-$ptbh^2$ sericite phyllite, slate, sandstone and siliceous rock etc., the

stringer-shaped intermediate-acid (quartz diorite) dyke in Caledonian period is occasionally seen. What is worth reflecting on is that this type of dyke is not intruded into the compressive ore-controlling fracture zones F_1 and F_2. According to the 1: 1,000,000 satellite photograph scanned and taken by the 5-7 wave band (MSS 5-7 yellow red- infrared light) of earth resources technology satellite provided by NASA, the sign of concealed intermediate-acid igneous rock mass is not seen in Longsheng area and within the scope of Sanmen complex anticline. But in this photograph, the sign of concealed igneous rock mass is extremely obvious in the other areas. It is estimated that the total content of SiO_2 in two metallogenic belts of this zone and required for silicification of the ore-controlling fracture's surrounding rocks reaches more than 100 million tons. If there is no enormous acid igneous rock mass, a lot of middle-low temperature acid hydrothermal solution source containing SiO_2 cannot be provided for mineralization. In the intermediate-acid dyke as above mentioned, the rock mass is too small to provide a lot of SiO_2 for mineralization. To sum up, it can be thought that the magmatic rock in this zone is unrelated to the genesis of talc ore.

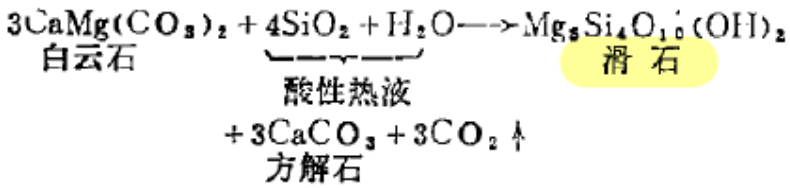
Average component calculation sheet of six gabbro-diabase samples

Oxide	Content (%)	Number of molecules	Characteristic number
SiO_2 50.80 846 TiO_2 1.04 14 Al_2O_3 15.11 149 MgO 7.70 191 CaO 5.02 89 Fe_2O_3 0.39 3 FeO 8.44 118 MnO 0.19 3 P_2O_5 0.18 1 Na_2O 3.60 58 K_2O 0.68 7		$S = 846 + 14 = 860$ $A = (58 + 7) \times 2 = 130$ $\because Na_2O + K_2O < Al_2O_3$ $C = 149 - (58 + 7) = 84 < CaO$ $B = FeO' + CaO' + MgO$ $FeO' = FeO + Fe_2O_3 \times 2 + MnO$ $= 118 + 3 \times 2 + 3 = 127$ $CaO' = CaO - C = 89 - 84 = 5$ $B = 127 + 5 + 191 = 323$ $N = A + B + C + S = 1397$ $S = \frac{860}{1397} \times 100 = 61.56,$ $a = \frac{130}{1397} \times 100 = 9.3$ $b = \frac{323}{1397} \times 100 - 23.00,$ $C = \frac{84}{1397} \times 100 = 6.0$ $Q = S - (3a + 2c + b)$	
Total	93.15	1397	$Q = S - (3a + 2c + b)$ $= 61.56 - (3 \times 9.3 + 2 \times 6 + 23)$ $= -1.34$

III. Genesis of Ore Deposit

1. Problem Posing

It is generally thought in the metallogenic theory that the dolomite marble is metasomatized by the post-magmatic middle-low temperature acid hydrothermal solution to generate the talc ore, which is expressed according to the following reaction equation:



白云石	Dolomite
酸性热液	Acid hydrothermal solution
滑石	Talc
方解石	Calcite

Proven by Johnston and Niggli, in the metasomatism process of solid minerals, the reactant follows the principle of keeping roughly equal in volume with the resultant, namely the law of equivoluminal metasomatism. It is thought by F.J Turner and other scholars that when a kind of metamorphic rock assemblage is generated from mother rock and there is no obvious change in total composition or specific gravity (or weight), the law of equivoluminal metasomatism must be appropriate. It can be seen from the law of equivoluminal metasomatism that the above reaction equation is worthy to be discussed.

The left and right sides of the reaction equation balance the weights of reactant and resultant, but the law of equivoluminal metasomatism for solid minerals is not taken into consideration. We know that the weight of pure dolomite (or specific gravity) is roughly equivalent to that of pure talc (or specific gravity). While the weight of the former is 2.87g/cm^3, the weight of the latter is 2.78g/cm^3. Based on the thesis of Turner, the above reaction equation should abide by the law of equivoluminal metasomatism. Now the total gram-molecular volume of solid minerals on the left and right sides of the above reaction equation is calculated as follows [gram-molecular volume= (molecular weight/specific gravity)].

$$3CaMg(CO_3)_2 + 4SiO_2 + H_2O \longrightarrow Mg_3Si_4O_{10}(OH)_2 + 3CaCO_3 + 2CO_2\uparrow \quad \cdots\cdots(1)$$

分子总体积　198　88　140

（厘米³）　286　251　111

分子总体积	Total molecular volume
厘米 ^{3}	cm^3

Seen from the above reaction equation, the total molecular volume of solid minerals on the left and left sides of the reaction equation differs greatly. In this zone, the dolomite marble is directly replaced by talc and the content of calcite generated is small (less than 5%). In the above equation, the molecular volume of three gram molecules of dolomite is 198 cm^3 and the molecular volume of one gram molecule of talc is 140cm^3, so their molecular volume differs greatly and thus the law of equivoluminal metasomatism is not satisfied. According to the law of equivoluminal metasomatism, one gram molecule of talc only needs two gram molecules of dolomite (132 cm^3). Therefore, the content of MgO in the dolomite is obviously insufficient. To meet the requirement for generating the talc, one gram molecule of MgO must be added from the external surrounding rocks, or else the pure dolomite marble cannot be metasomatized to generate the talc ore deposit that has the industrial value.

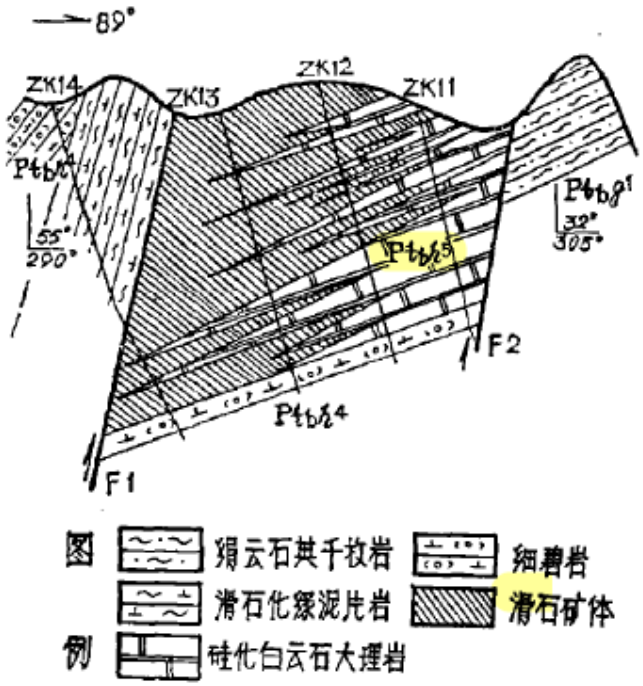


Figure 3 Geological profile of Line VII in the Lower Jizhua Mining District

图例	Legend
绢云石英千枚岩	Sericite quartz phyllite
细碧岩	Spilite
滑石化绿泥石片岩	Talcous chlorite schist
滑石矿体	Talc ore body
硅化白云石大理岩	Silicified dolomite marble

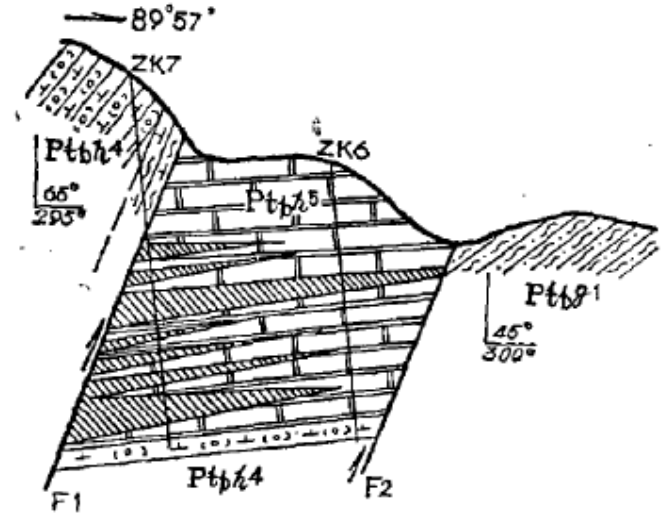
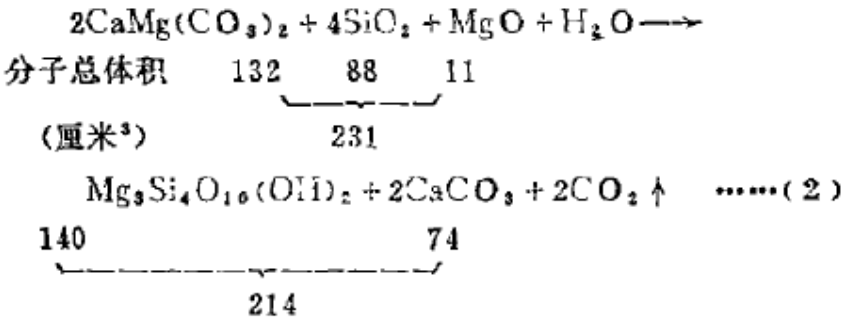


Figure 4 Geological profile of Line V in the Lower Jizhua Mining District

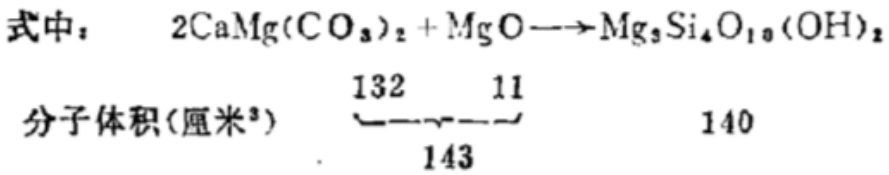
(the legend is the same as Figure 3)

In fact, although the single dolomite marble ($ptbh^5$) in this zone is cut by several regional NNE compressive fractures, the mineralization is not common as shown in Figure 3 and Figure 4. In the hanging wall of the compressive fracture F_2, the degree of mineralization of dolomite marble ($ptbh^5$) is quite weak because of the lack of MgO in the heading wall of formation ($ptbh^1$) containing sericite phyllite, slate and siliceous rock. In the mineralization process, MgO cannot be supplemented to the dolomite marble. On the contrary, the spilite containing a lot of MgO occurs in the hanging wall of the compressive fracture F_1 (containing 8.14% MgO on average). In the mineralization process, a lot of MgO can be supplemented to the dolomite marble, so the mineralization of dolomite marble that occurs near the compressive fracture F_1 is strong and the interlayers and remains of dolomite marble gradually decrease along the direction of spilite. To sum up, based on the geological features of mineralization of talc ores in this zone as well as the enrichment law, we think that it is suitable to take the following reaction equation (2):



分子总体积	Total molecular volume
厘米 3	cm^3

Where:



分子体积	Molecular volume
厘米 3	cm^3

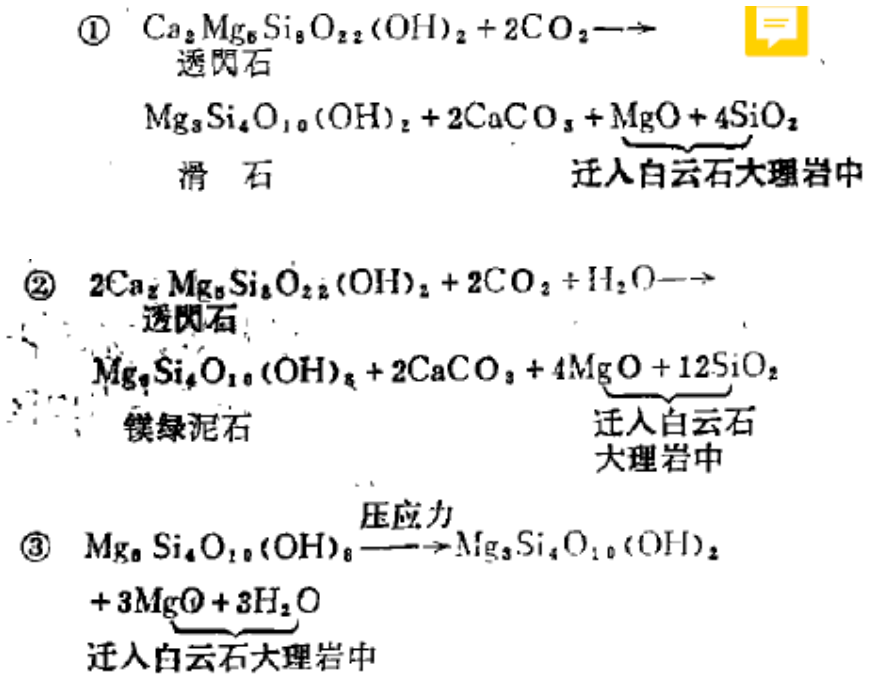
In other words, the molecular volume of two gram molecules of dolomite and one gram molecule of MgO is 143 cm^3, which is roughly equal to the molecular weight of one gram molecule of talc generated (140 cm^3). Therefore, the law of equivoluminal metasomatism is basically satisfied and the genesis and enrichment law of talc ore deposit in this zone also can be objectively reflected.

2. Genesis Analysis of Talc Ore Deposit in This Zone

Seen from the above reaction equation (2), to learn about the genesis of talc ore deposit in this zone in detail, in addition to the investigation of geological conditions like ore-controlling fracture structure and mineralization mother rock-dolomite marble, it is also required to explore the cause and effect of conveying MgO to the metallogenic belt of surrounding rocks from the outside and also track the source of acid hydrothermal solution containing SiO_2. Now the geological features of mineralization in this zone are respectively discussed as follows:

(1) Source of MgO

The mother rock that is directly related to mineralization is dolomite marble. This formation contains 19% MgO in this zone, so the requirement for generating the talc ore deposit cannot be completely satisfied and MgO must be absorbed from the external surrounding rock to supplement and the surrounding rock that satisfies this formation condition is spilite (ptbh[4]). In this zone, the content of MgO in spilite is 8.14% on average. Through rock-mineral determination and analysis, MgO is mainly concentrated in the tremolite (the content of tremolite in spilite is 30-35%). When the regional compressive fracture cuts the spilite, the spilite near the fracture zone is molten into the dynamic alteration zone of talcous chlorite schist under the action of strong extrusion and violent friction. This metamorphic zone varies from 10m to 40m in with, showing obvious schistosity, and the schistosity occurrence is roughly parallel to the fault plane. The talcous chlorite schist is mainly comprised of the chlorite. The main content in chlorite is the amesite that is altered from soda feldspar, clinozoisite and tremolite in the spilite. The secondary content in chlorite is the talc (the content is about 20%) that is altered from tremolite. In addition, the calcite assemblages or stringers as well as quartz stringers and gobbets are frequently seen. In the above alteration process, no matter whether the tremolite is altered into amesite or talc or part of the amesite is further altered into the talc under the action of compressive stress, a lot of MgO and SiO_2 as well as the hydrothermal solution of calcite (secondary hydrothermal solution) are decomposed so as to provide enough acid hydrothermal solution containing MgO and SiO_2 for generation into talc ores from dolomite marble. In the dynamic metamorphism process generated from fracture change, the alteration of minerals containing magnesium can be expressed by the following reaction equations:



b

透闪石	Tremolite

滑石	Talc
迁入白云石大理岩中	Transferred into the dolomite marble
透闪石	Tremolite
镁绿泥石	Amesite
迁入白云石大理岩中	Transferred into the dolomite marble
压应力	Compressive stress
迁入白云石大理岩中	Transferred into the dolomite marble

The above reaction equations just can explain for the paragenetic association of minerals for talcous chlorite schist and also can reflect the genesis and enrichment factors of talc ores in this zone. Proven by the exploration work, the same ore deposit is located in the same ore-controlling fracture zone and the degree of mineralization of dolomite marble has an obvious superposition relationship with the width of alteration zone of the talcous chlorite schist in the hanging wall of fracture zone as shown in Figure 3 and Figure 4; if the alteration zone is wide, the degree of mineralization will be strong as shown in Figure 3; if the alteration zone becomes narrow, the degree of mineralization of dolomite marble will obviously decrease as shown in Figure 4. This is because the rich source of MgO is closely related to the alteration strength of spilite and thus the degree of mineralization of dolomite marble is directly affected.

(2) Hydrothermal Solution Containing SiO_2

The general acid hydrothermal solution containing SiO_2 comes from the magma. As above mentioned, the source of hydrothermal solution for mineralization (belonging to middle-low temperature) has no genesis relationship with the local magmatic rocks. It is thought through field observation that the source of acid hydrothermal solution containing SiO_2 used for generating the talc ore should be related to the dynamic metamorphism of regional compressive fracture. When searching along this type of fracture zone, it is found that the silicification degree and alteration nature of surrounding rocks near this fracture zone are closely related to the lithology of surrounding rocks in the hanging wall and the heading wall, especially the enrichment degree of SiO_2. By taking the fracture F_2 for an example, when this fracture cuts the formation ($ptbg^1$) containing sericite quartz phyllite, slate and siliceous rock, the quartz dykes in the hanging wall and heading wall of this fracture zone are greatly developed, the rock silicification is very strong, secondary quartz rock and oil stone lodes are associated, and the dolomite marble is altered into the silicified marble. When this fracture cuts the single dolomite marble, the degree of silicification is relatively decreased and generally only the highly fractured zone is generated to form 16m-wide crushed marble as shown in Figure 5. When the compressive fracture cuts the spilite, besides the talcous chlorite schist, calcite and quartz stringers are also associated, but the silicification degree of rocks is still weak. Within the regional compressive ore-controlling fracture zone, the polymetallic mineralization

phenomenon is not yet found and the genesis of talc ores in this zone is hard to be explained by post-magmatic hydrothermal mineralization theory. It is thought by such scholars as Yeliseyev and Niggli that "the melting temperature of minerals will be reduced under the influence of directional pressure". Therefore, it can be thought that closed complex overturned fold and dense NNE imbricate compressive fracture are generated in the east wing of Sanmen complex overturned anticline in this zone due to the intensive concentration of NWW-SEE compressive stress. Due to the extremely strong change of this fracture and the substantial uplift of hanging wall, it is speculated that the vertical fault displacement is larger than 300m according to formation rupture and loss. Under such strong extrusion and violent friction, strong heat energy must be generated so as to melt the surrounding rocks near the fracture zone, especially the high-strength sericite quartz phyllite, slate and siliceous rock ($ptbg^1$-$ptbg^2$) etc. containing a large amount of SiO_2. After the surrounding rocks are molten, a large amount of secondary middle-low temperature acid hydrothermal solution containing SiO_2 as well as intermediate-acid dyke rocks (quartz diorite) can be generated so as to provide sufficient hydrothermal solution source for mineralization.

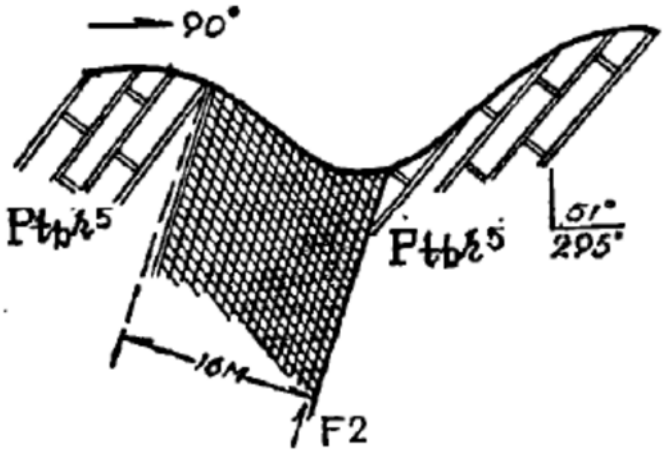


Figure 5 Fractured zone in the hanging wall of Fracture F_2 (the marble extruded into the cataclastic rock)

IV. Summary

1. The genesis of talc ore deposit in this zone should be the product of dynamic metamorphism. Therefore, the mineralization must be controlled by the regional NNE compressive fracture that is strongly active, and the hydrothermal solution source for mineralization is the derivative from the change of this fracture.

2. The dolomite marble is metasomatized into the talc ore by acid hydrothermal solution containing SiO_2. As their specific gravity (or weight) is roughly equal, the metasomatism must follow the equivoluminal principle. In other words, only two gram molecules of dolomite are required to generate one gram molecule of talc. Obviously, MgO in dolomite is insufficient and it must be supplemented from the external surrounding rock (spilite).

3. In this zone, the dolomite marble contacts with the spilite containing a large amount of MgO via

the regional compressive fracture, which is a precondition for searching the talc ore. And the dynamic metamorphic zone of spilite as well as the development of talcous chlorite schist is an important factor for controlling the mineralization degree of dolomite marble.